INJURIES AND ILLNESSES OF VIETNAM WAR POWS. II. ARMY POWS

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Injuries and Illnesses of Vietnam War POWs. II. Army POWs

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The first report in this series[1] presented the results of repatriation medical examinations of US Navy personnel who had been held as prisoners of war (POWs) in Vietnam. The present report describes the medical status of the 77 repatriated POWs (RPWs) who were members of the US Army.

The characteristics of the Army RPWs may be summarized as follows: there were 28 officers (including 10 Warrant Officers) and 49 enlisted men; the average age at time of capture was 27.6 years for officers, and 23.0 years for enlisted men; duration of captivity (in months) averaged 44.3 for officers, and 52.1 for enlisted men.

Duty assignments at time of capture included: 23 helicopter pilots and aircrew members, 16 combat infantry, 10 Special Forces, eight advisors, seven truck drivers, two fixed-wing aircrewmen, and 11 miscellaneous.

The present report describes the procedures and findings of the medical teams that examined and treated the RPWs at Clark Air Force Base. (Republic of the Philippines), and at eight mainland Army hospitals.

All Army RPWs had been captured in South Vietnam (SVN), and spent several weeks to several years there, involuntarily sharing the harsh life of a roving guerilla band.[2-3] The majority of the RPWs were transferred, after varying periods of time, to enter the prison system in North Vietnam (NVN), but 23 per cent spent their entire captivity in the South.

A brief overview of prison conditions can serve as a backdrop for understanding the physical and psychological stresses this group of men endured during captivity. In SVN, POWs were held in small groups accompanying guerilla bands as they travelled in the mountain jungle or wet, swampy areas.[2-3] Shelter consisted of bamboo and thatch "hootches" or sometimes bunkers dug in the soil. If the area was sufficiently far from American troops and the jungle or swamp sufficiently difficult to travel through, the men would not be restrained; otherwise, they were chained or manacled inside their cages. In addition to having to endure whatever extremes of weather that were present, particularly the monsoon rains which flooded the hootches, the POWs lived in an endemic malaria area. They shared the guerillas' fate of being at the tail end of the supply chain, which usually meant inadequate amounts of food, medicine, and other vital supplies. Rice was eaten almost exclusively, although sometimes manioc (a tuberous plant similar to a yam) was substituted. The POWs also ate whatever greens, fish, small animals, or reptiles they could scavenge.[3-5]

Medical care for POWs held in SVN was much more limited than in NVN. Although in some secure areas the Viet Cong had set up field hospitals, no American POWs were treated there. One Army physician was held captive in SVN for a few years, but he was not allowed to treat his fellow POWs (although he did so covertly).[3] Medical care was provided by the guerillas themselves, who sometimes had a soldier attached to their unit who functioned as a corpsman. The quantity of medicines available (including vitamin B_1 for beriberi and quinine for malaria) was always extremely limited. POWs rarely received medication until they were desperately ill, due, in part, to the fact that use of medicines to treat a POW might mean that none would be available if one of the guerillas fell ill.

In NVN, POWs were held in conventional prisons, or buildings that had been converted to prisons, in or near metropolitan areas.* Not only was food better quantitatively and qualitatively in NVN than in SVN but, after late 1969, the quantity of food increased, and conditions improved generally in NVN, but not in SVN.

In the present report, the emphasis is on documentation of the diagnoses made at "Operation Homecoming." Where appropriate, information is also presented concerning symptoms and conditions which occurred during captivity (as described in histories obtained by Operation Homecoming physicians).

Methods

The repatriation plan, originally drawn up under the code name "Egress Recap," was later given the name "Operation Homecoming." Details of the repatriation plan at "Operation Homecoming" (O/H) were described previously.[1] Briefly, all RPWs were admitted to the sicklist for a minimum of 90 days during O/H, with most RPWs spending the first two to four weeks actually in the hospital. During this period, the RPW was in the care of a primary physician, usually an internist, although general medical officers and surgeons were also utilized. All RPWs were evaluated by other consultants as needed.

O/H directives called for recording of all positive and negative findings. The basic tool to accomplish this documentation was the Initial Medical Evaluation Form (IMEF), a 400-page, 29-section instrument detailing all procedures to be done and providing space to record the results. The details of this document have been described in our earlier report.[1]

After each RPW was discharged from the sick list, his complete O/H medical record was forwarded to the Center

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*Details of the captivity experience in North Vietnam have been described previously.[1,4,5]

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Table 1

Most Common Diagnoses Among Army Vietnam RPWs at Operation Homecoming

ICDA*	Diagnosis	Freq.	Percent
120.0-129.9	Helminthiases	59	77
260.0-269.9	*Avitaminoses & Other Nutritional Deficiencies*	42	55
389.9	Hearing Impairment	31	40
111.0-110.9	Dermatophytosis	30	39
952.0-957.9	Peripheral Nerve Injury	30	39
084.0-084.9	Malaria	26	34
370.0-370.9	Refractive Errors	22	29
307.0	Transient Situational Disturbance	19	25
377.0-377.9	Other Diseases of Retina & Optic Nerve	18	23
706.0-706.9	Disease of Sebaceous Gland	17	22
40000-40009**	Amoebiasis	17	22
460.0-466.9	Acute Upper Respiratory Infection	14	18
805.0-805.9	Fractured Vertebrae (Compression)	14	18
891.0-891.9	Open Wound - Knee, Leg, Ankle	13	17
782.6-787.2	*Edema - Swelling*	12	16
455.0	Hemorrhoids	11	14
680.0-686.9	Skin Infections (Bacterial)	11	14
733.6	Residual Foreign Body	11	14
728.0-728.9	Vertebrogenic Pain Syndrome	10	13
377.2	Amblyopia, Acquired	9	12
054.0	Herpes Simplex	8	10
079.1	Viral Warts	8	10
692.9	Eczema & Dermatitis	8	10
757.1	Pigmented Nevus	8	10
713.1	Spondylitis Osteoarthritica	7	9
873.0-873.9	Laceration - Head	7	9
306.8+791.0	Cephalagia - Headaches	6	8
360.0	Conjunctivitis	6	8
504.0	Deflected Nasal Septum	6	8
507.0	Hay Fever	6	8
519.2	Inactive Pulmonary Granulomatous Disease	6	8
872.9	Open Wound - Ear, Late Effect	6	8
40200-40212**	Positive PPD	6	8
111.0	*Pityriasis Versicolor*	5	6
285.9	Anemia, Unspecified	5	6
373.0-373.9	Strabismus	5	6
470.0-474.9	*Influenza*	5	6
480.0-486.9	Pneumonia	5	6
714.0	Traumatic Arthritis	5	6
725.0-725.9	Schmorl's Nodules	5	6
735.0	Scoliosis	5	6
756.1	Anomalies of Lumbosacral Joint	5	6
781.3	Disturbed Hearing (Tinnitus)	5	6
945.0-945.9	Burn - Lower Limb	5	6
004.0-004.9	Bacillary Dysentery	4	5
273.5	Gilbert's Syndrome	4	5
280.0	Iron Deficiency Anemia	4	5
300.0-300.9	Neuroses	4	5
377.3	Color Blindness	4	5
490.0	Bronchitis	4	5
550.0	Inguinal Hernia	4	5
564.0-564.9	Functional Disorder - Intestine	4	5
690.0	*Seborrheic Dermatitis*	4	5
875.0-875.9	Open Wound - Chest	4	5
881.0-881.9	Open Wound - Elbow, Forearm, Wrist	4	5
890.0-890.9	Open Wound - Hip, Thigh	4	5

* ICDA: Code numbers taken from U.S. National Center for Health International Classification of Diseases for Use in the U.S., 8th Rev.
** Code numbers created by CPWS Medical Specialties Branch

for Prisoner of War Studies (CPWS) in San Diego for study and microfilming. Included were medical records from Clark AFB, complete hospital in-patient charts, and the IMEF forms. All diagnoses, abnormal signs, symptoms, and laboratory results were extracted and recorded on individual coding sheets, along with pertinent ancillary information relating to etiology, history, treatment (if any), and status of each diagnosis at time of the RPW's release from the sick list. Diagnostic code numbers were assigned using the *International Classification of Diseases, Adapted for United States, Eighth Edition* (ICDA-8).† Occasionally the ICDA-8 system was inadequate (e.g., positive PPD reaction) and, in these instances, a CPWS coding system was used. All data were key-punched for computer analysis, and analyzed using standard statistical programs.

Results

The 77 RPWs accumulated 1,149 diagnoses (an average of 14.9 per RPW), which comprised 386 separate diagnostic entities.

Table 1 lists, in rank order, the most frequently occurring diagnoses. The frequency count gives the number of RPWs presenting with each particular diagnosis.‡

Among the numerous and diverse diagnoses not appearing in Table 1 due to their low frequency, several warrant mention because of their clinical significance. One RPW was severely wounded in the lumbar spine at the time of capture, cutting part of the cauda equina at the L-5 level, producing paraplegia and accompanying urinary and fecal incontinance. Another RPW was wounded in the left parietal area, with sequelae including both generalized and focal motor seizures, moderate expressive aphasia, spastic right hemiparesis, and a right-central facial neurologic defect. A third RPW, age 20, also suffered both a head wound producing persisting generalized convulsive seizures, and a left-side cerebrovascular accident which produced a five-hour loss of consciousness and a left hemiparesis of four-months duration during captivity. At the time of release, he had fully recovered from his hemiparesis. Still another RPW suffered brief amnesia and a transient left hemiparesis at the time of shootdown. A fifth RPW was severely beaten during captivity and, at repatriation, x-rays of his skull showed a calcified intracerebral hematoma.

There was one RPW with mild essential hypertension at repatriation, and two other RPWs had minor ECG abnormalities. One man was successfully resuscitated during captivity by the Army POW-flight surgeon, after suffering what was diagnosed at O/H as a pulmonary embolus.

A variety of gastrointestinal diagnoses were made at O/H, notably two duodenal ulcers, two peptic ulcers, and one case of esophagitis.

†The painstaking work of research assistants Nancie Cicalo, John Deaton, Carol Million, and Nancy Shreve is gratefully acknowledged.

‡The frequency count indicates the number of RPWs presenting with the given diagnosis. Where a number of diagnoses have been combined (e.g., Helminthiases 120.0-129.9), an RPW is counted only once in the "category" even though he may have both Ascariasis 127.0 and Trichuriasis 127.2. In several cases, an RPW presented with two or more problems, each carrying the same diagnostic label; in this report the RPW is counted only once for a given diagnosis.

Five RPWs passed renal stones in captivity (as indicated by rather classic histories). These were attributed by them to dehydration due to the limited amount of drinking water provided. At repatriation, there were two diagnoses of nonvenereal urethritis, two of prostatitis, and three miscellaneous urinary tract infections.

Respiratory system diagnoses at O/H included: 14 acute upper respiratory infections and four acute bronchitis. An additional four RPWs presented with influenza. On the basis of prolonged productive cough and fever, three RPWs believed that they had developed pneumonia during captivity. Chronic bronchitis was diagnosed in two RPWs by O/H physicians, largely on the basis of a history of chronic cough. Episodes resembling acute asthmatic attacks occurred in two RPWs during captivity, but have not recurred since repatriation. These attacks were of sufficient severity to prompt the captors to treat the men with unknown pills and injections.

Table 2 lists the various diagnoses of malnutrition. Additional diagnoses and historical symptoms whose etiologies may include nutritional aspects were as follows: nine diagnoses of nutritional amblyopia, mostly of minimal degree; two RPWs with radiological evidence of osteoporosis; and 31 RPWs who reported that edema or swelling of the extremities (usually of the lower legs and lasting from a few days to several weeks) had occurred during captivity.

Transient, mild laboratory abnormalities were seen in many of the RPWs. Occasionally, the BUN was elevated, generally in the range of 25 to 35, for about one to four weeks. The serum creatine was normal in these individuals, as were additional renal function studies when done. Similarly, the SGOT and SGPT, and sometimes the LDH, were mildly elevated for two to three weeks. There was one case of acute refeeding pancreatitis, although complaints of vague, low grade abdominal discomfort were common the first few days after release. This may have been due to the RPWs gorging themselves on traditional American foods long denied them and the problems were treated symptomatically. There was one case of refeeding gynecomastia. There were three cases of asymptomatic elevated serum uric acid levels, and four RPWs were diagnosed as having Gilbert's syndrome.

Table 2

Malnutrition in Army Vietnam RPWs

ICDA*	DIAGNOSIS	FREQ.	PERCENT
260	Vitamin A deficiency	5	6
261	Thiamine deficiency	12	16
263	Other B vitamin deficiency	7	9
264	Ascorbic acid deficiency	3	4
265	Vitamin D deficiency	1	1
266	Vitamin deficiency, not further specified	8	10
267	Protein malnutrition	1	1
269	Sprue	1	1
269.9	Malnutrition, not further specified	22	29
280.0-281.9	Deficiency anemia	6	8

* ICDA: Code numbers taken from U.S. National Center for Health International Classification of Diseases for Use in the U.S., 8th Rev.

Table 3 presents the infectious and parasitic diseases diagnosed at O/H. Nearly all of the RPWs were convinced that they had "worms." This was based on frequently seeing worms in their stools in captivity, or occasionally plucking an ascaris out of one's nose or mouth. Their convictions are supported by the fact that ova or cysts were found in fecal smears in 77 per cent of the RPWs at O/H (Table 1).

All the RPWs had diarrhea in captivity, especially while held in the South. The frequency and duration of diarrheal episodes did, however, vary considerably from one RPW to another. Most of the RPWs were convinced that they had dysentery in captivity, and several described watery diarrheal stools containing blood and mucus and occurring several times a day. Others used a "formula": 10-20 stools per day was diarrhea, and anything over that was dysentery. The decision in this article was to accept as dysentery only those cases in which an etiologic agent was actually identified at O/H.

Table 3 also lists the diagnoses of malaria, based on positive antibody titers, as determined by the Center for Disease Control in Atlanta. There were four RPWs with *Plasmodium* (*P.*) *falciparum*, and eight with *P. vivax*. There were nine RPWs with mixed infection: four with *P. falciparum* + *P. vivax*, and five with three species (*P. falciparum* + *P. vivax* + *P. malariae*). Although all RPWs were given standard end-of-tour malaria prophyllaxis, three had recurrences of acute attacks after discharge from the sick list; one of the attacks responded only to treatment with an experimental drug.

During captivity, 34 additional RPWs were given "quinine" for febrile episodes diagnosed by Vietnamese paramedics, without benefit of blood smears, as "malaria." These individuals were seronegative for malaria antibody titer at O/H.

Discussion

The health of the RPWs at O/H was better than had been anticipated under "worst case" planning assumptions. Nevertheless, there are a number of individuals with permanent impairments, and many others who are "at risk" because of the extended period of time during which they were subjected to protein-calorie and vitamin-malnutrition.[5,7-9]

Eleven men reported their lowest estimated captivity weight as being 100 pounds or less. Table 3 lists the diagnoses related to malnutrition taken from the hospital records. The accuracy of these diagnoses is open to question due to several problems: first, they are based, in part, on a layman's description and memory of events which occurred several years earlier. Secondly, many of the so-called "classic" signs of vitamin deficiency are subjective (e.g., night blindness) or can have several causes (e.g., cheilosis).

Thirty-one (40 per cent) of the RPWs reported episodes of "edema" and "swelling" during captivity, including the 12 individuals with symptoms persisting up to the time of O/H (Table 1). In at least some instances, these resemble textbook descriptions of wet beriberi (pedal and ankle edema, rapidly progressing to involve upper legs and scrotum). In some cases, the Vietnamese paramedic made a diagnosis of "beriberi" and treated it with "thiamine," with

a rapid response. The one Army physician held as a POW felt, however, that these cases represented "hunger edema" due to low serum protein levels.

The signs and symptoms of clinical thiamine deficiency in the RPWs could also be attributed to traumatic peripheral nerve injury resulting from the extensive use of various restraining devices by their captors. The use of ropes, ratchet hand cuffs, leg irons, and stocks has been described in detail elsewhere.[1-2, 4-6] These often constricted an extremity, producing ischemic injury, swelling, and paresthesias, as did the forced maintenance of one position for a prolonged period. It is also possible that the swelling and paresthesias were due to an interaction between low thiamine levels and ischemic injury.

The deficiency anemias (Table 3), due to inadequate iron and/or folate, were diagnosed on the basis of serum measurements of these nutrients. The one diagnosis of "probable tropical sprue" was based upon tests indicating a malabsorption state and the appearance of the small bowel series. No small bowel biopsy was performed.

Tuberculosis was one of the three most common causes of death among RPWs in the period immediately after World War II.[9] In contrast, there were no diagnoses of active tuberculosis among the current group of RPWs, although four men had positive PPD tests. In all of these cases, the most recent skin tests prior to captivity were negative.

There were 113 serious injuries (including fractures, wounds, and burns, sometimes of a multiple nature). In nearly all instances, these were received in the fire fight immediately preceding capture. The majority of these injuries healed uneventfully, in spite of the minimal care received, leaving only a scar, although 11 RPWs had residual shrapnel at repatriation. One exception was open wounds of the ear. These, allegedly, were due to a captor practice of striking POWs with a cupped hand over the ear, in an attempt to break the tympanic membrane. Out of six RPWs reporting this assault, all had scarred tympanic membranes on examination.

Fourteen RPWs (18 per cent) had radiological evidence of vertebral compression fractures, an incidence level which is more characteristic of a group of aviators who had been forced to eject from jet aircraft[1] than it is of "typical" Army injuries. It may be speculated that some of these occurred during crashes of helicopters but, in point of fact, this accounts for only one case.

In spite of the fact that most of the 14 other fractures (noncompression) were secondary to gunshot wounds and the adverse conditions under which the RPWs were held, there were only two cases of osteomyelitis.

Another curious fact is the high incidence of impaired hearing, (31 RPWs or 40 per cent). Although such a finding is expected among aviators continually exposed to jet noise, why this should also be so among Army RPWs is not clear. Indeed, only 10 of the diagnoses of impaired hearing occurred among the 25 Army RPWs who were involved with helicopters or fixed wing aircraft.

Other reports have indicated that skin diseases were the greatest medical cause of time lost by soldiers fighting in Vietnam, and the POWs shared this problem. Twenty-one of the RPWs (27 per cent) had bacterial skin infections, usually boils, carbuncles, pyodermas, and cellulitis. Dermatophytoses were diagnosed in 30 of the RPWs (39 per cent); the 30 individuals represent 42 diagnoses, of which 23 were fungal foot infections.

Table 3 presents the infectious and parasitic diseases diagnosed in the RPWs. The incidence of both the helminthiases and the malarial disases reflect the intimate sojourn of the POWs in the SVN jungles. Although the number of cases is relatively small, only among Army RPWs were any diagnoses of Schistosomiasis, Clonorchiasis, Fasciolopsiasis, and Strongyloidiasis made.

Malaria, until recently, was responsible for more deaths per year, on a world-wide basis, than any other transmissible disease. It is definitely endemic in SVN and many RPWs described what they considered to be repeated attacks of malaria, of gradually attenuating severity.

"Premature aging" is a concept frequently invoked in discussions of former POWs.[9-11] Evidence bearing on this matter in Vietnam RPWs is scant. Nevertheless, eight of the Army RPWs were 19 or 20 years old at time of capture, and late adolescence is still a vulnerable time to undergo the stress of malnutrition. Two RPWs presented with radiologic osteoporosis. In one RPW, this condition was restricted to the bones of the lower extremities, and was apparently due to disuse secondary to paraplegia; for the second RPW a mild osteoporosis was detected only in the lumbosacral spine and, while premature aging cannot be ruled out definitively, there was strong evidence of nutritional defi-

Table 3

Infectious and Parasitic Diseases in Army Vietnam RPWs

ICDA*	Diagnosis	Freq.	Percent
	Intestinal Bacterial Infections		
003	Salmonella	2	3
004	Bacillary Dysentery	4	5
	Intestinal Protozoal Infections		
40001**	E. histolytica	6	8
40002**	E. coli	12	16
40003**	E. nana	5	6
007	Giardia	2	3
40009**	Other (E. buetschilli)	1	1
40009**	Other (E. hartmani)	1	1
	Malaria		
084.0	Plasmodium falciparum	13	17
084.1	Plasmodium vivax	17	22
084.2	Plasmodium malariae	5	6
	Helminthiases		
120	Schistosomiasis	1	1
121.1	Clonorchiasis	1	1
121.4	Fasciolopsiasis	1	1
126	Ancylostomiases	35	45
127.0	Ascariasis	33	43
127.1	Strongyloidiasis	3	4
127.2	Trichuriasis	24	31
127.3	Enterobiasis	7	9

* ICDA Code numbers taken from U.S. National Center for Health International Classification of Diseases for Use in the U.S., 8th Rev.

** Code numbers created by CPWS Medical Specialities Branch

ciencies in this individual. Another interesting question is whether expected or "normal" age-related changes will occur earlier, among these POWs, than they might have otherwise. Seven RPWs (nine per cent) had degenerative changes of the spine ("spondylitis osteoarthritica") as evidenced by x-ray. There was no evidence of endocrinologic aging, such as decreased glucose tolerance.

The World War II and Korean POW post-captivity experiences were characterized by prolonged and recurrent medical and psychiatric problems.[8-13] The precise role of the captivity experience in the genesis of those problems of earlier POWs remains controversial and undetermined. Nevertheless, increased morbidity and mortality certainly seems to exist among them.[9] Perhaps a more favorable outcome can be expected in this new group of RPWs because of the thoroughness of the medical and dental treatment during O/H, and the planned continuation of the program of examination and treatment in future years.

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

Seventy-seven Army POWs were repatriated in Feb - March, 1973, spending up to eight years in South and North Vietnam prisons (mean duration of captivity = 49.3 months). There were 28 officers (mean age at time of capture = 27.6 years) and 49 enlisted men (mean age = 23.0 years). This report documents the injuries and illnesses diagnosed at repatriation. Although the repatriated POWs (RPWs) were generally healthier than had been expected they had an average of 14.9 diagnoses, comprising 386 separate diagnostic entities. The ...

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six most prevalent diagnoses were: Helminthiases (77% of the RPWs), Avitaminoses and Other Nutritional Deficiencies (55%), Hearing Impairment (40%), Dermatophytosis (39%), Peripheral Nerve Injury (39%), and Malaria (34%). All diagnoses occurring in at least five percent of the RPWs are reported. In addition, less frequently occurring, but clinically significant diagnoses are discussed.